

## Chapter #20

# INTERDISCIPLINARY INNOVATION CAMP FOR NURSING AND ENGINEERING STUDENTS AT WNUAS

**Eivind Standal Husabø, Dagrun Kyrkjebø, & Joar Sande**

*Western Norway University of Applied Sciences, Norway*

### ABSTRACT

Western Norway University of Applied Sciences (WNUAS) in cooperation with Junior Achievement Sogn og Fjordane, organizes interdisciplinary innovation camps for nursing and engineering students. The student assignments are given by local businesses and organizations. This study's objective is to evaluate and develop new programs for innovation camps, as well as to share ideas with educators working with this type of learning activity. A qualitative method was used, and a focus group interview was conducted involving nursing and engineering students (n=8). The students were satisfied with innovation camp as a method for learning, and the learning outcome was good. They regard innovation camp as a diverging learning method. The students are lacking a common understanding of innovation and entrepreneurship before participating at the event, the assignments were too limited, and they were not challenging enough for creative thinking. This study leads to several conclusions to improve upcoming innovation camps at WNUAS. The improvements can be separated into two categories: 1. The students need to be better prepared for the event. 2. The assignments need to be more open.

*Keywords:* innovation, entrepreneurship, higher education, pedagogical model, innovation camp.

### 1. INTRODUCTION

This article describes nursing and engineering students at the Western Norway University of Applied Sciences (WNUAS), Campus Førde and their experiences from participating in innovation camp in higher education. We want to look particularly at how the student experiences can improve future innovation camps.

The universities and university colleges in Norway educate graduates who are familiar with innovative thinking and innovation processes, and the institutions are developing innovative educational programs. Candidates should be able to use their knowledge and skills in a self-contained way and master change and uncertainty. The education sector also facilitates interprofessional collaborative learning in education programs, and this leads to better collaborative practices in the professional world (EU, 2013; Gilbert, Yan, & Hoffman, 2010; Ministry of Education and Research, 2008, 2012, 2017). The professional education programs the students in this study represent have requirements for interprofessional proficiency throughout their educational programs (Ministry of Education and Research, 2008, 2011).

To respond to the challenge of educating competent and change willing graduates who are trained to work interprofessional, WNUAS in collaboration with Junior Achievement Sogn og Fjordane (JA) has since 2014 organized interprofessional innovation camps for nursing and engineering students at campus Førde.

## 2. BACKGROUND

### 2.1. Entrepreneurship as a phenomenon in the Norwegian education system

From the latter half of the 1990s, there was a broad political debate in Norway that entrepreneurship should become a focus area for the entire educational process, where pupils and students should work on real issues across subjects. Various governmental documents have, over the years, facilitated entrepreneurship as a strategy for learning in where the local community is used as a learning arena in collaboration with local companies and organizations (Ministry of Education and Research, 1997, 2004, 2009).

#### 2.1.1. Entrepreneurial learning

The European Commission defines entrepreneurship as follows:

Entrepreneurship is a dynamic and social process in which individuals, alone or in collaboration with others, identify opportunities and does something about them by transforming ideas into practical and purposeful activities. This could be in either a social, cultural or economic context (Ministry of Education and Research, 2004).

Ødegård (2014) views entrepreneurship as a multidisciplinary phenomenon. The different scientific traditions have different approaches to the phenomenon, something that has led to wide variations in both the practice and the perception of the concept of entrepreneurship. Schumpeter (1934) is one of the classics of entrepreneurship research. He characterizes an entrepreneur as an innovative force and an exponent of a multidisciplinary approach to entrepreneurship. Schumpeter's ideas are easily identifiable even in today's research on the phenomenon of entrepreneurship in education (Ødegård, 2014).

Ødegård defines educational entrepreneurship as action-oriented teaching and training in a social context with the individual as an actor of its own learning where personal qualities, abilities, knowledge and skills form the basis and direction for the training (Ødegård, 2003).

Central to this thinking is experience-based learning in interaction with external actors outside the education system. Ødegård and Ask (2014) define these actors as local, regional, national and international. One of the main objectives of implementing educational entrepreneurship as a learning strategy is to build up the student's ability to master transition and change in a future perspective related to occupational practice and participation in society (Ødegård, 2014). Educational entrepreneurship is, on the one hand, pedagogy with long traditions in education, socialization, knowledge, motivation and learning, and on the other hand it is grounded in economic tradition with business development, personal initiative and risk (Haara & Jenssen, 2016).

In general, there are four different motives behind the initiative for entrepreneurship in education: *The founding of businesses motive* is based on the schools being able to develop job creators and establishers. *The district policy motive* emphasizes that young people should be involved in developing and utilizing the resources in the local community, as well as ensuring settlement in the districts. *The labor market motive* is based on educating students for tasks in the working world that require change and action skills. From a business and economical perspective there will also be a need for better understanding of finance, administration and management. *The general educational motive* is based on the challenge to make the students creative, enterprising and able to do a good job in the future (Ødegård, 2000).

Educational entrepreneurship has a general educational perspective that aims to make students assets for participation in a future social and working life that is constantly changing (Leffler, 2006). Entrepreneurial learning can be enhanced by factors as experience-based learning, problem-based learning as well as learning to see opportunities. The sociocultural learning approach emphasizes a learning process where all participants are on an equal footing (Dysthe, 1999). This learning can be further enhanced through a network-oriented approach with access to extensive information and resources for the student. It creates a learning arena that is close to the real world (Järvi, 2012). Former students can be used as a resource in such a learning process and then be portrayed as "peer students" (Harland, 2003).

A lack of common understanding of the phenomenon educational entrepreneurship among employees in the educational institutions may lead to uncertainty associated with learning outcomes using entrepreneurship as a strategy for learning. Earlier studies have shown that more research is needed to meet the need for knowledge about entrepreneurial approaches to learning (Haara, Jenssen, Fossøy, & Ødegård, 2016).

### **2.1.2. Junior Achievements (JA) role in the educational system**

JA defines itself as a bridge builder between the education system, business and industry. The main focus of JA is learning through the use of entrepreneurship as a strategy. One important element in this is the expanded value creation perspective. According to Lackeus (2018), an expanded understanding of value creation in an entrepreneurial context will contain five important factors: economic and social value creation, influence, harmony and joy in creating something new. In an educational context, creating value for oneself will be as important as creating value for others. Influence is mentioned as a particularly important value creation factor for students. By using the local community as an arena for learning, where one expands the educational institution's learning and action space, one will be able to provide the student with skills that otherwise would be difficult to acquire through what can be perceived as traditional teaching.

### **2.1.3. Innovation camp in higher education**

Innovation Camp is a program within the JA system with focus on innovation and creation of new ideas. The program can be conducted as an idea competition for students where the assignment to be solved is the central part. The assignment is given by a company or an organization from the private or public sector. The challenge stated in the assignment must be an experienced and real challenge for the assignment provider. It is crucial that the students will perceive the work with their solution to the innovation camp assignment as an important contribution to the assignment provider in retrospect. Hence, that their solution might be implemented in the assignment providers future strategies and practice.

While executing the program, the assignment provider actively participates by being present and presenting the assignment. They also join and follow the students through the entire event as student advisors. At the end of the camp, while the students are presenting their assignment solutions, the assignment providers will participate on giving the students feedback. Hasleberg and Hagen (2016) point out that the use of peer students is useful in conducting an innovation camp. These are students who themselves has been through the program, and then used as specialists and advisors for new students who participate in the program. Students who find it difficult to go outside their comfort zone, and who does not like surprising moments in the teaching program, are referred to as "security seekers". Surprising moments are part of the teaching methods for this kind of events, and this is something the students must learn to deal with on the go (Hasleberg & Hagen, 2016). A Danish study investigated whether interdisciplinary innovation camps contributed to gain hands-on experience in the field of creativity, innovation and entrepreneurship (Ringby

& Duus, 2017). The students, most of them from nursing and physiotherapy programs, were used to interdisciplinary work. Student facilitators and lecturers were present during the camp.

#### **2.1.4. Cross curricular collaborative learning (CCCL)**

CCCL is seen as facilitated situations where two or more professional groups learn with, by and about each other to improve collaboration and quality of service (CAIPE, 2019). To learning *with* contains elements of engagement, learning from each other based on trust and respect for other persons knowledge. Learning *about* is about knowing professions other than their own. This can be seen as activities that give students a common frame of reference and identity (Bainbridge & Wood, 2012) and that strengthen the knowledge of teamwork (Stewart, 1989). Boge (2012) found that interdisciplinary innovation camps where students from different disciplines work together is functional for the purpose of CCCL. Students do not need to know each other from before, and the goals of learning outcome may differ. It is important that the learning process is well organized. Taking students out of the school situation can be effective in building teams and fostering creativity and innovation (Bager, 2008).

### **2.2. Innovation camp at WNUAS - Engineering and nursing students**

Innovation camps have been facilitated at campus Førde since the autumn of 2014. The initiative came from the teachers who wanted to create a common learning arena for engineering and nursing students. The background was to make a response to the requirements in the national qualification framework for education (Ministry of Education and Research, 2014), and to create an understanding of each other's professional areas. One important goal was for students to build new skills by learning from each other. It was equally important to make them understand that in the future they will depend on each other's expertise and competence for the best for patients and users. The innovation camp program is being implemented at several higher educational institutions throughout the country, but the innovation camp at campus Førde is unique in the matter of nursing and engineering students working together.

The professional content at the innovation camp in the fall of 2017, with around 80 participants, consisted of training in creativity, work in groups and presentations in plenary. The day before the camp, the students received a brief review of what innovation and entrepreneurship is. They were given examples on technical innovations and innovations within health care. The groups met the next day and started with blank sheets. One large health institution was the assignment provider for all the groups at the camp, and the students received two different assignments. The first assignment was to develop a hospital bed that reduces the risk of patients falling and injuries because of falling. The second assignment was to reduce the risk of falling in the shower and to improve the working situation of the health care workers. The students should create a sketch that explained the functionality, design, production and marketing of a hospital bed or shower chair that would meet specific requirements from the assignment provider. During the innovation camp the assignment providers were available for guiding the students throughout their working process. Two of the main criteria on evaluating the students were innovative and user-friendly solutions. Emphasis was also placed on focus, interaction and how the students divided the task among the group participants.

### **2.3. Purpose**

The study's objective is to evaluate and develop new programs for innovation camp, as well as to share knowledge and ideas with educators who are working with this type of learning activity.

## **3. METHODS**

A qualitative, exploratory approach was chosen to study this phenomenon in depth, and a focus group interview was conducted involving nursing and engineering students (n=8). The study was conducted among students who participated in the Innovation Camp in the fall of 2017. In this way, it allows us to describe and explore human experiences, perceptions and qualities. By using this method, diversity and detail in the material can be presented in a good way. A qualitative approach is often chosen when the researchers are developing theories or when there are no ambitions to achieve results to be generalized (Kvale & Brinkmann, 2015).

The inclusion criteria for participation in the study were that the students should have participated in the innovation camp in the fall of 2017 as one group. An open-ended interview guide with four questions was used. Two of the researchers in the group conducted the interview, one of the authors acted as moderator, while the second author took the role of assistant. The moderator's job was to introduce the interview topics and to facilitate a good exchange that would allow everyone to voice their opinions. The third researcher transcribed the material so that everyone gained close knowledge of the material that emerged in the interview.

### **3.1. Informants**

A group of eight students that participated in the camp in the fall of 2017 were asked if they would like to participate in the evaluation study and all of them agreed to do so. Two of the students were prevented from meeting, and the interview was conducted with six informants. Of the six participants, three were women and three men, five of whom were undergraduate students in nursing, and one was undergraduate students in engineering. The big difference in numbers of students from the two student groups may affect the result. At the same time, the number of nursing students is much larger than the number of engineering students, so that the composition of the focus group was approximately equal to the ratio between the two student groups. The informants received the interview guide before the focus group interview so that they had the opportunity to prepare. Audio recordings of the interview were made using digital audio recorders.

### **3.2. Analysis**

The material is processed and interpreted within a phenomenological-hermeneutic tradition (Polit & Beck, 2018) and is inspired by Graneheim and Lundman (2004). The analysis process started at the interview stage. Following the interviews, the moderator and assistant discussed potential conversation outcomes and made notes of these discussions. After transcription, we read the transcripts multiple times and compared them with the sound recording to make sure that the content had been fully understood. Together, the researchers went through the transcribed material and data were systematically based on the research questions. We extracted quotes and studied these to identify the meaning units. At the next stage of the process, we condensed the meaning units without changing their content. Further in the analysis process, we proceeded to subject the meaning units to analysis and abstraction while we were maintaining the original sense. We allocated codes to the various units. In this

way, we could encode the text and go through the material and put together the text sections that said something about the same, common theme.

Finally, there were categories created. The latent content of the material was formulated in three different themes: 1) The students lack a common understanding of the concept of innovation. 2) Interdisciplinary collaboration is challenged by lack of knowledge of the other profession's competence. 3) The assignment at the innovation camp encourages creativity too little.

The latent content implies an interpretation of the message in the text, while what is directly expressed in the text is called the manifest content (Graneheim & Lundman, 2004).

### **3.3. Ethical considerations**

The study was approved by the Data Privacy Officer, at the Norwegian Centre for Research Data (NSD), project number 57470. The storage of data and the conduction of the study was completed in accordance with ethical guidelines and Declaration of Helsinki (WMA Declaration of Helsinki, 2013). The informants received both oral and written information about the study, and all of them signed a personal form of informed consent. In the text, the informants are anonymized, and they cannot be recognized in the material presented.

## **4. RESULTS**

The findings presented in this chapter are based on a focus group interview with nursing and engineering students who participated in the innovation camp in the fall of 2017. Three main themes were analyzed: 1) The students lack a common understanding of the concept of innovation. 2) Interprofessional collaboration is challenged by lack of knowledge of the other profession's competence. 3) The assignment at the innovation camp encourages creativity too little.

### **4.1. The students lack a common understanding of the concept of innovation**

The informants talk about an educational program in which they to a small extent work on real issues that concerns innovation and entrepreneurship, this problematizes the students from both nursing and engineering. In the professional life, engineering students come up with a different approach where it comes to keeping up with the development: "If there is something new, you have to change it right away." The informants also point out that you cannot do things the way you always have done it, and the programs at the university should be restructured in line with the changes in society.

The nursing students were to some extent afraid that innovation would entail additional work that goes beyond other important tasks: "When it comes to studying nursing, new input is often more work into a very busy workplace, and people may suffer from burnout where they work. Then it is difficult to get new things done." The students also say that they see several factors that can make it difficult to create innovation in the health care organizations; this is finances, time, knowledge and willingness to change.

### **4.2. Cross-professional collaboration is challenged by lack of knowledge of the other profession's competence**

The informants are looking for more opportunities to collaborate across the fields of nursing and engineering. The students see that the severe need in connection to the technological developments within the health care services: "There will be more cooperation

between both engineers and nurses. Things change and one gets more technology and things like that.”

The students experience the days as students as busy and do not wish for more teaching or more subjects, but rather that innovation and entrepreneurship may be included and coordinated with existing subjects: “If you could have taken something existing and co-operated there, it would have been better. Then I agree. It was fun for us. But I don't think I had the energy to do so much more.” They agreed that it was important to have a day when the students could work interdisciplinary and discuss together. They meant it was good for students in both engineering and nursing.

Another possible collaborative arena that the students mentioned was an interdisciplinary bachelor project. Then the nursing students could work on ethical and human aspects of the project, while the engineering students could look at the technical solutions: Then you need those who are in the nursing field to look at possible ways in which you can go under the regulations and how it affects people and things like that, the more human-like part of the regulations. While the engineers are successful with calculation and how to design a system. Then you can combine this.

The nursing students were unsure of their own role in the innovation camp and some of the informants thought that the engineering students could solve the task alone. However, it was clearly stated that the nursing students' contribution was significant in the design of the assignment, with their skills and knowledge that the engineering students did not have: “It was a great advantage that the nursing students participated ...”

#### **4.3. The assignment at the innovation camp encourages creativity too little**

The informants pointed out that the creativity session at the start of the innovation camp could be challenging. At the same time, they stated that there were little room for creativity exercises in the school system in Norway and that this may have been something they had received too little training in. One of the students was very negative about the creativity session and had received feedback from fellow students on this, but the student saw that it worked for other participants.

The students were also clear that the assignment they worked on could advantageously be less detailed. In this way, their creative skills would be more challenged, and they would find it more meaningful to work on the assignment: “It might have been better that less specifications were given in advance, and that we were encouraged to find the specifications ourselves.” The informants stated the importance of a learning process related to working with innovation and innovative ideas, one could rather emphasize that they came up with ideas themselves organized as a project:

“We discussed the idea. The group of nursing students should look at what the idea contained. How it will affect all human factors, ethics, etc. The engineering students should investigate possible technical solutions. In the end, the two groups of students came together, and took into consideration the possibility to realize the idea and a final product.”

## **5. DISCUSSION**

The study was conducted to evaluate and further develop existing innovation camp programs, as well as to share experiences related to this type of learning activity.

Entrepreneurship and innovation camps as a strategy for education aims to bring students and local businesses closer together to create a learning arena for innovation and entrepreneurship (Junior Achievement Norway, 2017; Ministry of Education and Research,

2009; Ødegård & Ask, 2014). These intentions can be difficult to achieve when students do not have a common understanding of what innovation and entrepreneurship are. Innovation camp as a form of work with open assignments will challenge students to be creative. This may seem to be difficult for some students. Hasleberg and Hagen (2016) indicates that some students find it difficult to step outside the comfort zone and work in a creative and innovative way. Even if the students are not used to being challenged on creativity, it turns out that the assignments at the innovation camp were not open enough. They were too detailed and did not inspire to creativity in a good enough way.

Personal characteristics of an entrepreneur are initiative, motivation, self-confidence and risk-taking (Schumpeter, 1934). In entrepreneurial learning processes, emphasis is on student-active learning, where counselors and students instead of providing answers ask open-ended questions. Harland (2003) recognizes that in problem-based learning, the counselor is not a counselor in the traditional sense, but more a mentor who goes on a par with the students in a development process. Former students who themselves have been through innovation camps can be used as mentors, so-called "peer students" (Hasleberg & Hagen, 2016). Most student peer facilitators contribute to create a good learning environment (Ringby & Duus, 2017). Students with experience from innovation processes help to increase learning outcomes.

The room for learning should be based on the socio-cultural view of learning. In such a system, learning takes place in a community where all participants are equally valuable with their unique competence. In this way, knowledge is constructed through interaction where not only one right answer exists (Dysthe, 1999). The innovation camp should create a good learning environment that promotes student activity. Nursing students and engineering students, in principle, do not have a common language. An engineering student automatically thinks in a technical way, such as the measurement principle of a fall sensor, should it measure pressure, acceleration or height. This is a language that nursing students do not understand. The nursing students are the users who see the final product. Through the innovation camp, the students gained greater insight into the knowledge of each other. The fact that the students worked together in the nursing laboratory to better understand the problem shows that learning takes place in a social practice community (Dysthe, 1999).

The students do not have a clear understanding of what innovation and entrepreneurship are. One example of this may be nursing students who think it is development of new technology making nurses redundant. They are concerned that the technology will get in the way of the interpersonal relations in health care (Gjelsvik, Gjerstad, & Nødland, 2016). Nevertheless, they believe that technology is the future, and that those who work with medical-technical equipment are important. One barrier to innovation in health services is that it takes a long time to make changes because approval procedures take a long time. The students' experiences from different internships show that work tasks are performed in the way they have always been done. It is the desire of the students to be able to have an interdisciplinary bachelor thesis. Today, the two programs differ in terms of number of credits and the design of the thesis. Another barrier is that nursing students are very much in practice, so it can be difficult to get continuity in work. Despite this, the students believe that an educational offer combining engineering and health care could have become popular.

The informants had made up their minds about the actual implementation of the innovation camp. Among other things, they think that one can start by having a brainstorming session, and then dividing them according to educational direction where they still work for themselves in their field of study. The nursing students can look at the human factors, while the engineering students work with the technical solutions. After a while, the groups can meet to discuss common solutions. Not all need to be the same day; it can rather be put up as a



project work. A good group process can generate many ideas, which means that every participant gets better because there are other participants present. Interdisciplinary innovation camps can work well without the students knowing each other beforehand if the activity is well organized (Boge, 2012). Tuckman and Humphreys (1965) theory of group work, with the phases of “forming, norming, storming and performing” can be used in this context. When a group first meet, most are polite and positive, some are nervous because they do not know what to do while others are excited. In the next phase, there may be conflicts because the members have different ways of working. Questions will be asked about the assignment itself; some may think it is too much work and will not take responsibility. After addressing these questions and inequalities, members learn to appreciate each other’s strengths. They are now able to ask for help and provide constructive feedback. Only now is the group coming in at that stage that it can start producing to reach the goal.

The introduction session did not emphasize group processes, all the phases mentioned by Tuckman and Humphreys (1965) had to be gone through in a short time. This led to a short period of productive phase. To get a better group process, you may want to give the groups a few minutes to tell about their work midway through the innovation camp, to inspire each other. In this way, all the groups become involved in the learning room (Dysthe, 1999).

## **6. CONCLUSIONS**

The informants were essentially well satisfied with innovation camp as a form of work. They do not wish for mandatory attendance, but experience shows that participation then becomes worse (Hasleberg & Hagen, 2016). They will therefore recommend compulsory attendance at this type of event to ensure multidisciplinary participation and appropriate group size. The students have understood that one of the purposes of the day is that they should learn to work in teams and gain insight into the knowledge and competence of each other. Creativity and innovation can be promoted by taking students out of the ordinary school situation (Bager, 2008) and facilitate interdisciplinary cooperation where one invites external collaborators.

Innovation and entrepreneurship should be a more integrated part of the course of study for both programs, to ensure a common understanding. Bachelor theses can be interdisciplinary, even in so different programs as engineering and nursing study. One way to do this is to let several groups work on different assignments within the same theme. This requires that the professors collaborate on the collection and design of assignments.

Introduction to the innovation camp proves to be more important than we have thought. The introductory session should also be a review of expectations, and a clarification that everyone has something to contribute, and be organized in a way that prepares students for the academic content. Innovation and entrepreneurship are important in all professions, and everyone needs training in creative thinking. It can turn out to be uncomfortable and challenging for some, and therefore some students often opt out of the process as “security seekers.” It then becomes important to work for these to come out of their comfort zone (Hasleberg & Hagen, 2016). The professional knowledge the students use in a creative process is what creates something new. An innovation at the intersection of technology and health care can be presented to students before the innovation camp, showing the interdisciplinary work is what is important in this context, not the technical one.

The assignments themselves at the innovation camp must be more open, something that corresponds to the socio-cultural learning view and entrepreneurial learning (Dysthe, 1999; Leffler, 2006). Example on such an assignment can be what sensors to put into the home of elderly people who want to stay at home as long as possible. Another assignment may be that

a room in the hospital can be designed to be the best possible for the patient, relatives and those working there.

To capture changes and developments in social and working life, this type of event should be under continuous evaluation and improvement. Innovation camp in higher education is one of several contributions that will increase competence within innovation and entrepreneurship. These are competences that are in demand in today's working life, and which are becoming even more in demand in the future.

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## AUTHORS' INFORMATION

**Full name:** Joar Sande

**Institutional affiliation:** Western University of Applied Sciences

**Institutional address:** Svanehaugvegen 1, 6812 Førde

**Email address:** joar.sande@hvl.no

**Short biographical sketch:** Joar Sande is an Assistant Professor at Department of Computer Science, Electrical Engineering and Mathematical Sciences. His research interests are in flipped classroom and production of electronic learning material. He has a master's degree in electrical engineering from South Dakota School of Mines and Technology (USA), and holds a degree in economics from BI Norwegian Business School.

**Full name:** Dagrun Kyrkjebø

**Institutional affiliation:** Western University of Applied Sciences

**Institutional address:** Svanehaugvegen 1, 6812 Førde

**Email address:** Dagrun.Kyrkjebo@hvl.no

**Short biographical sketch:** Dagrun Kyrkjebø is an Associate Professor in nursing at Department of Health and Caring sciences. Her research interests are in pedagogical models in education, nursing competence and competence development.

**Full name:** Eivind Husabø

**Institutional affiliation:** Western University of Applied Sciences

**Institutional address:** Svanehaugvegen 1, 6812 Førde

**Email address:** Eivind.Husabo@hvl.no

**Short biographical sketch:** Eivind Husabø is an Assistant Professor at Department of Pedagogy, Religion and Social Studies. His research interests are in entrepreneurship in education and leadership connected to development of innovation and business models for school-based enterprises. He has a master's degree in leadership from Western University of Applied Sciences.